

CLAIMS

What is claimed is:

1. A method of transforming a host cell, comprising introducing
5 into a host cell a nucleic acid molecule encoding a protein having at least one chromo domain, a helicase domain and a DNA binding domain, said protein expressed in an amount sufficient to regulate developmental identity.
- 10 2. The method of claim 1, wherein said nucleic acid molecule further encodes a protein having at least one zinc finger domain.
3. The method of claim 2, wherein said nucleic acid molecule further encodes a second chromo domain.
- 15 4. The method of claim 1, wherein said chromo domain is encoded by a nucleic acid molecule having a nucleotide sequence having at least about 50% identity to the nucleotide sequence set forth in SEQ ID NO:1 from nucleotide 343 to nucleotide 453, said helicase domain is
20 encoded by a nucleic acid molecule having a nucleotide sequence having at least about 50% identity to the nucleotide sequence set forth in SEQ ID NO:1 from nucleotide 877 to nucleotide 2217, and said DNA binding domain is encoded by a nucleic acid molecule having a nucleotide sequence having at least about 50% identity to the nucleotide sequence set
25 forth in SEQ ID NO:1 from nucleotide 3205 to nucleotide 3285.
5. The method of claim 2, wherein said zinc finger domain is encoded by a nucleic acid molecule having a nucleotide sequence having at least about 50% identity to the nucleotide sequence set forth in SEQ ID
30 NO: 1 from nucleotide 145 to nucleotide 288.

6. The method of claim 3, wherein said second chromo domain
is encoded by a nucleic acid molecule having a nucleotide sequence having
5 at least about 50% identity to the nucleotide sequence set forth in SEQ ID
NO:1 from nucleotide 571 to nucleotide 681.

7. The method of claim 1, wherein said nucleic acid molecule
has a nucleotide sequence encoding protein domains selected from the
10 group consisting of a chromo domain having an amino acid sequence
having at least about 50% identity to the amino acid sequence set forth in
SEQ ID NO:2 from amino acid 115 to amino acid 151, a helicase domain
having an amino acid sequence having at least about 50% identity to the
amino acid sequence set forth in SEQ ID NO:2 from amino acid 293 to
15 amino acid 739 and a DNA binding domain having an amino acid sequence
having at least about 50% identity to the amino acid sequence set forth in
SEQ ID NO:2 from amino acid 1069 to amino acid 1095.

8. The method of claim 2, wherein said nucleic acid molecule
20 has a nucleotide sequence encoding said zinc finger domain having an
amino acid sequence having at least about 50% identity to the amino acid
sequence set forth in SEQ ID NO:2 from amino acid 49 to amino acid 96.

9. The method of claim 3, wherein said nucleic acid molecule
25 has a nucleotide sequence encoding said second chromo domain having an
amino acid sequence having at least about 50% identity to the amino acid
sequence set forth in SEQ ID NO:2 from amino acid 191 to amino acid 227.

10. The method of claim 1, wherein said host cell is a eukaryotic
30 cell.

11. The method of claim 10, wherein said eukaryotic cell is a plant
cell.

12. The method of claim 11, wherein said eukaryotic cell is an animal cell.

5

13. The method of claim 12, wherein said animal cell is a mammalian cell.

14. The method of claim 13, wherein said mammalian cell is a human cell.

10

15. The method of claim 1, further comprising deleting the nucleotide sequences encoding any one of said domains prior to said introducing.

15

16. The method of claim 1, wherein said protein has a point mutation in lysine 304 of SEQ ID NO:2.

17. The method of claim 16, wherein said mutation results in said lysine being replaced by an arginine.

20

18. The method of claim 1, wherein said protein encodes PKL.

19. The method of claim 18, wherein said PKL has an amino acid sequence as set forth in SEQ ID NO:2.

25

20. The method of claim 1, wherein said nucleic acid molecule has a nucleotide sequence having at least about 80% identity to the nucleotide sequence set forth in SEQ ID NO:1.

ART 34 ADDI

21. The method of claim 1, wherein said nucleic acid molecule further comprises a promoter operably linked to a terminal 5' end of said nucleotide sequence.

22. The method of claim 21, wherein said promoter is selected from the group consisting of a constitutive promoter, an inducible promoter and a cell-specific promoter.

23. The method of claim 21, wherein said promoter is a foreign promoter.

24. The method of claim 18, wherein said PKL functions in repressing embryonic identity in said plant.

25. The method of claim 1, wherein said nucleic acid molecule comprises a nucleotide sequence having substantial similarity to the nucleotide sequence set forth in SEQ ID NO:1.

26. A method of transforming a host cell, comprising introducing into a host cell a nucleic acid molecule encoding a protein functioning in regulating developmental identity, said protein having an amino acid sequence having at least about 50% identity to the amino acid sequence set forth in SEQ ID NO:2, said protein functioning in regulating developmental identity.

27. The method of claim 26, wherein said protein has an amino acid sequence having at least about 80% identity to the amino acid sequence set forth in SEQ ID NO:2.

28. The method of claim 27, wherein said protein has an amino acid sequence as set forth in SEQ ID NO:2.

29. The method of claim 26, wherein said nucleic acid molecule has a nucleotide sequence as set forth in SEQ ID NO:1.

5 30. The method of claim 26, wherein said host cell is a eukaryotic cell.

31. The method of claim 30, wherein said eukaryotic cell is a plant cell.

10

32. The method of claim 30, wherein said eukaryotic cell is an animal cell.

33. A method of transforming a host cell, comprising introducing
15 into a host cell a nucleic acid molecule encoding a protein functioning in regulating developmental identity, said nucleic acid molecule having a nucleotide sequence having at least about 50% identity to the nucleotide sequence set forth in SEQ ID NO:1 from nucleotide 1 to nucleotide 4152.

20 34. The method of claim 33, wherein said protein functions in repressing embryonic identity.

35. The method of claim 33, wherein said nucleic acid molecule has a nucleotide sequence having at least about 80% identity to the
25 nucleotide sequence set forth in SEQ ID NO:1 from nucleotide 1 to nucleotide 4152.

36. The method of claim 35, wherein said nucleic acid molecule has a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide 1
30 to nucleotide 4152.

37. The method of claim 33, wherein said nucleic acid molecule further comprises a promoter operably linked to a terminal 5' end of said nucleotide sequence.

- 5 38. A method of transforming a host cell, comprising:
- (a) introducing into a host cell an antisense DNA or RNA molecule comprising a nucleotide sequence complementary to a length of nucleotides within a nucleic acid molecule encoding a protein having at least one chromo domain, a helicase domain and a DNA binding domain,
- 10 said protein functioning in regulating developmental identity; and
- (b) culturing said host cell under conditions effective for hybridization of said antisense molecule to nucleic acid of said host to regulate developmental identity.

- 15 39. The method of claim 38, wherein said protein encodes PKL.

40. The method of claim 38, wherein said nucleotide sequence is about 100 to about 1000 nucleotides in length.

- 20 41. The method of claim 38 wherein said nucleotide sequence is complementary to a region from about nucleotide 2 to about nucleotide 361 set forth in SEQ ID NO:1.

42. The method of claim 38, wherein said nucleotide sequence is
- 25 complementary to a region from about nucleotide 3330 to about nucleotide 3710.

43. The method of claim 1, wherein said nucleic acid molecule further encodes a protein having at least one zinc finger domain.

44. The method of claim 38, wherein said nucleic acid molecule further encodes a second chromo domain.

45. A method of transforming a host cell, comprising:

5 (a) introducing into a host cell an antisense DNA or RNA molecule comprising a nucleotide sequence complementary to a length of nucleotides within a first nucleotide sequence having at least about 50% identity to the nucleotide sequence set forth in SEQ ID NO:1, said first nucleotide sequence encoding a protein functioning in regulating
10 developmental identity; and

(b) culturing said host cell under conditions effective for hybridization of said antisense nucleotide sequence to nucleic acid of said host cell.

15 46. The method of claim 45, wherein said first nucleotide sequence has at least about 80% identity to the nucleotide sequence set forth in SEQ ID NO:1.

20 47. The method of claim 46, wherein said first nucleotide sequence is a nucleotide sequence that encodes PKL.

25 48. The method of claim 46, wherein said first nucleotide sequence is as set forth in SEQ ID NO:1 from nucleotide 1 to nucleotide 4152.

49. The method of claim 45, wherein said antisense molecule is about 100 to about 1000 nucleotides in length.

30 50. The method of claim 45, wherein said nucleotide sequence in complementary to a region from about nucleotide 2 to about nucleotide 361 set forth in SEQ ID NO:1.

51. The method of claim 45, wherein said nucleotide sequence is complementary to a region from about nucleotide 3330 to about nucleotide
5 3710 set forth in SEQ ID NO:1.

52. A method of transforming a host cell, comprising:

(a) introducing into a host cell a vector comprising a first nucleic acid molecule having a nucleotide sequence that is complementary
10 to a nucleotide sequence having at least about 50% identity to a length of nucleotides within the nucleotide sequence set forth in SEQ ID NO:1, said nucleotide sequence encoding a protein functioning in regulating developmental identity;

(b) generating an antisense nucleic acid molecule
15 complementary to an RNA transcript formed from SEQ ID NO:1; and

(b) culturing said host cell under conditions effective for hybridization of said antisense molecule to said RNA transcript of said host cell.

20 53. The method of claim 52, wherein said nucleic acid molecule has a nucleotide sequence that is complementary to a length of nucleotides within the nucleotide sequence set forth in SEQ ID NO:1.

25 54. The method of claim 52, wherein the antisense nucleic acid molecule is an RNA molecule.

55. A recombinant nucleic acid molecule, comprising:

(a) a nucleotide sequence encoding a protein functioning in regulating developmental identity, said protein having at least one chromo
30 domain, a helicase domain and a DNA binding domain, said protein expressible in an amount sufficient to regulate developmental identity; and

(b) a foreign promoter operably linked to a terminal 5' end
5 of said nucleotide sequence.

56. The method of claim 55, wherein said protein further has at least one zinc finger domain.

10 57. The method of claim 55, wherein said protein further has a second chromo domain.

58. A recombinant nucleic acid molecule, comprising:

(a) a nucleotide sequence encoding a protein functioning in
15 regulating developmental identity, said protein having an amino acid sequence having at least about 50% identity to the amino acid sequence set forth in SEQ ID NO:2 ; and

(b) a foreign promoter operably linked to a terminal 5' end of said nucleotide sequence.

20

59. The molecule of claim 58, wherein said foreign promoter is selected from the group consisting of a constitutive promoter, an inducible promoter and a cell-specific promoter.

25 60. The molecule of claim 58, wherein said protein has an amino acid sequence having at least about 70% identity to the amino acid sequence set forth in SEQ ID NO:2.

61. The molecule of claim 58, wherein said protein has an amino
30 acid sequence of PKL.

62. The molecule of claim 61, wherein said protein has an amino acid sequence as set forth in SEQ ID NO:2.

63. A recombinant nucleic acid molecule, comprising:
- (a) a nucleotide sequence encoding a protein functioning in regulating developmental identity, said nucleotide sequence having at least about 50% identity to the nucleotide sequence set forth in SEQ ID NO:1 from nucleotide 1 to nucleotide 4152; and
 - (b) a foreign promoter operably linked to a terminal 5' end of said nucleotide sequence.

64. The molecule of claim 63, wherein said foreign promoter is selected from the group consisting of a constitutive promoter, an inducible promoter and a cell-specific promoter.

65. The molecule of claim 63, wherein said nucleotide sequence has at least about 80% identity to the nucleotide sequence set forth in SEQ ID NO:1 from nucleotide 1 to nucleotide 4152.

66. The molecule of claim 65, wherein said nucleotide sequence is as set forth in SEQ ID NO:1 from nucleotide 1 to nucleotide 4152.

67. An isolated nucleic acid molecule, comprising a nucleotide sequence encoding a protein functioning in regulating developmental identity, said nucleotide sequence encoding a protein having at least one chromo domain, a helicase domain and a DNA binding domain.

68. The molecule of claim 67, wherein said nucleic acid molecule further encodes a protein having at least one zinc finger domain.

69. The molecule of claim 68, wherein said nucleic acid molecule further encodes a second chromo domain.

70. A eukaryotic cell, comprising:

5 (a) an introduced nucleic acid molecule having a nucleotide sequence encoding a protein functioning in regulating developmental identity, said protein having an amino acid sequence having at least about 50% identity to the amino acid sequence set forth in SEQ ID NO:2.

10 71. The cell of claim 70, wherein said protein has an amino acid sequence having at least about 50% identity to the amino acid sequence set forth in SEQ ID NO:2.

15 72. The cell of claim 71, wherein said protein has an amino acid sequence as set forth in SEQ ID NO:2.

73. The cell of claim 70, wherein said cell is a plant cell.

20 74. The cell of claim 70, wherein said cell is an animal cell.

75. A transgenic plant, comprising:

25 (a) an introduced nucleic acid molecule having a nucleotide sequence encoding a plant protein functioning in regulating developmental identity, said protein having an amino acid sequence having at least about 50% identity to the amino acid sequence set forth in SEQ ID NO:2; and

(b) a foreign promoter operably linked to a terminal 5' end of said nucleotide sequence.

30 76. The transgenic plant of claim 75, wherein said nucleotide sequence is an antisense DNA or RNA molecule.

77. The transgenic plant of claim 75, wherein said protein has an amino acid sequence having at least about 80% identity to the amino acid sequence set forth in SEQ ID NO:2.

78. The transgenic plant of claim 77, wherein said protein has the amino acid sequence of PKL.

79. The transgenic plant of claim 78, wherein said amino acid sequence is as set forth in SEQ ID NO:2.

80. A recombinant protein, comprising a protein having an amino acid sequence having at least about 50% identity to the amino acid sequence set forth in SEQ ID NO:2.

81. The protein of claim 80, wherein said protein has an amino acid sequence having at least about 80% identity to the amino acid sequence set forth in SEQ ID NO:2.

82. The protein of claim 81, wherein said protein has an amino acid sequence as set forth in SEQ ID NO:2.

83. A method of producing a PKL protein, comprising:
(a) introducing a nucleotide sequence encoding a protein having at least about 50% identity to the amino acid sequence set forth in SEQ ID NO:2; and
(b) culturing said host cell under conditions effective to achieve expression of the PKL polypeptide.